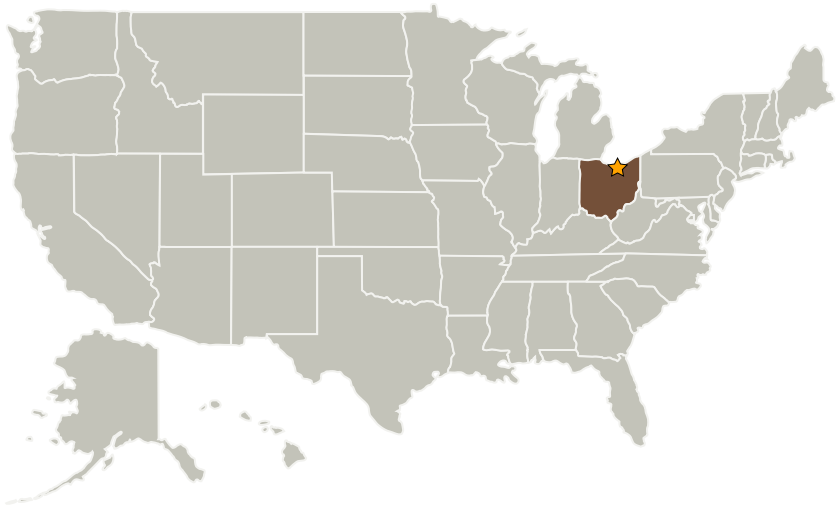
Multi-Element Lean Direct Injection Combustor Module, Phase I

Completed Technology Project (2007 - 2007)

Project Introduction

We propose to develop a Multi-Element Lean Direct Injection, ME-LDI, Combustion concept with the following innovative features: 1. Independent, mini burning zones created by containing the flame in a cylinder downstream of each fuel injector/swirler element in a multiple fuel injector array, see figure 1. The independent burning zones will enable fuel staging the fuel injectors (turning off fuel to selected fuel injectors) to cover the operating cycle, such that at each point of the operating cycle the combustor will have high combustion efficiency (>99%) and low NOx emissions. At high power conditions the combustion efficiency should be greater than 99.9%. 2. A low flow number, "Butterfly" fuel injector will be incorporated into ME-LDI that is low cost and simple to manufacture but a highly effective atomizer. The term "Butterfly" derives from the butterfly shape of the spray. The shape of the spray is formed by two diametrically opposed slots cut through a closed end fuel tube, see figure 2. The fuel flow through each slot forms a fan spray. The slot width can be varied to control drop-sizes within the spray.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Sun Valley Technology	Supporting Organization	Industry Minority-Owned Business	Warrensville Heights, Ohio

Primary U.S. Work Locations
Ohio

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.3 Aero Propulsion
    - TX01.3.12 Alternative Low Carbon Jet Fuel